Course Name (Advanced Networking)

1	Subject Name	Advanced Networking
2	Course Code	
3	Teaching Hours/week	2 hours/Week
4	Practical /week	1 Hour/Week
5	Credits	4
6	Reference Book	CCNA Routing and Switching Study Guide - Lammle, Todd
7	Teaching method	Lecture & Problem Based Learning
8	Subject Status	
9	Prerequisite	Knowledge of Network Fundamentals

Course Description

The advanced networking course includes the associate level introduction and configuration of Cisco networking and internetworking devices (especially switches and routers). In this course, the most important topics from the Cisco CCNA course are included. This course has a 50-50 theoretical and practical portion. The simulations tools like Cisco Packet Tracer & GNS3 as well as physical cisco devices are used. This course will enable the students to build, configure, manage and troubleshoot small to medium size networks using cisco devices.
The main topics covered in this course are:

- Routing along with its types
- Routing protocols such as RIP, OSPF & EIGRP
- ACL
- NAT
- VLAN
- Switch-port Security
- STP

Learning Objectives

The main objective of the course is to equip the students with the knowledge and skills of cisco switch and router configuration. By the end of the course, the students will be able to build, manage, control and troubleshoot small to medium size networks using the cisco devices (Routers & Switches).

Week 1	**Introduction of the course:** - Introduction to the course - Introduction to network & internetwork - Introduction to Cisco Courses: - Broadcast domain and collision domain - Hub operation - Switch operation - Router operation
Week 2	**Introduction to IP, sub-netting & VLSM** - IPv4 & its classes - APIPA & Loopback IP - Private & Public IP - VLSM - Sub-netting IPv4 - Subnet mask notations -
Week 3	**Cisco IOS, Accessing Cisco Router/Switch, Router/Switch Boot Process & Cisco Router Modes:** - Cisco ISO - Accessing Router/Switch by multiple methods - Router or switch boot process - Cisco router modes - CDP -
Week 4	**Telnet & SSH:** - Introduction to Telnet and SSH - telnet configuration and verification - SSH configuration and verifications - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 5	**Routing** - Static routing - Default routing - Dynamic routing - Pros and cons of static routing - Link-state routing protocols - Distance vector routing protocols - Hybrid routing protocols - AD value - Metric

Week 6	**Static Routing & Default Routing:** - Configuration of static routing - Configuration of default routing - Trouble shooting of static and default routing - Verification commands for static and default routing - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 7	**RIPv1 & RIPv2:** - Detailed description of the RIP - Difference between RIPv1 and RIPv2 - RIPv1 and RIPv2 configuration - Troubleshooting and verification of RIPv1 and RIPv2 - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 8	**IGRP & EIGRP:** - Detailed description of IGRP - Detailed description of EIGRP - Difference between IGRP & RIP - EIGRP configuration - EIGRP troubleshooting and verification - **COMPUTER LAB (STUDENTS PRACTICE)**
MID TERM EXAMINATION	
Week 9	**OSPF:** - Detailed description of OSPF - DR & BDR operations - Setting RID - Configuration of OSP - Troubleshooting and verification of OSPF - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 10	**Switching, STP & switch-port Security** - Switch operations - Switch functions - Introduction to STP - Root bridge and Non-root bridge - Designated and non-designated ports - Switch priority - Managing STP - Working with switch-port security - **COMPUTER LAB (STUDENTS PRACTICE)**

Week 11	**VLAN** - Introduction to VLAN - VTP - VTP Domain - VTP Modes - Frames tagging - Frame tagging protocols o ISL o Dot1Q - Access and trunk ports
Week 12	**VLAN & Inter-VLAN configuration** - Inter-VLAN routing using: o Using multiple links o Using router on-stick - Configuration of VLAN and inter-VLAN routing - Troubleshooting and verification of VLAN **COMPUTER LAB (STUDENTS PRACTICE)**
Week 13	**ACL** - Standard ACL - Extended ACL - Named ACL - ACL Configuration - ACL verification - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 14	**NAT** - NAT - PAT - Static NAT - Configuration of PAT using ACL - Verification of PAT - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 15	**Working with IPv6:** - Introduction to IPv6 - Assigning IPv6 to routers - Routing using IPv4 - **COMPUTER LAB (STUDENTS PRACTICE)**
Week 16	**Overall Review & Quiz:** - Overall review of the lectures - QUIZ

Assessment

1) Midterm exams 20 %
2) Attendance and group work 10 %

3) Projects, presentations, and other tasks 10 %
4) Final Exam 60 %

Total Marks: **100**

Recommended Books:

- CCNA Routing and Switching Study Guide - Lammle, Todd